Option discussion- Option 2 (Conditional Range)

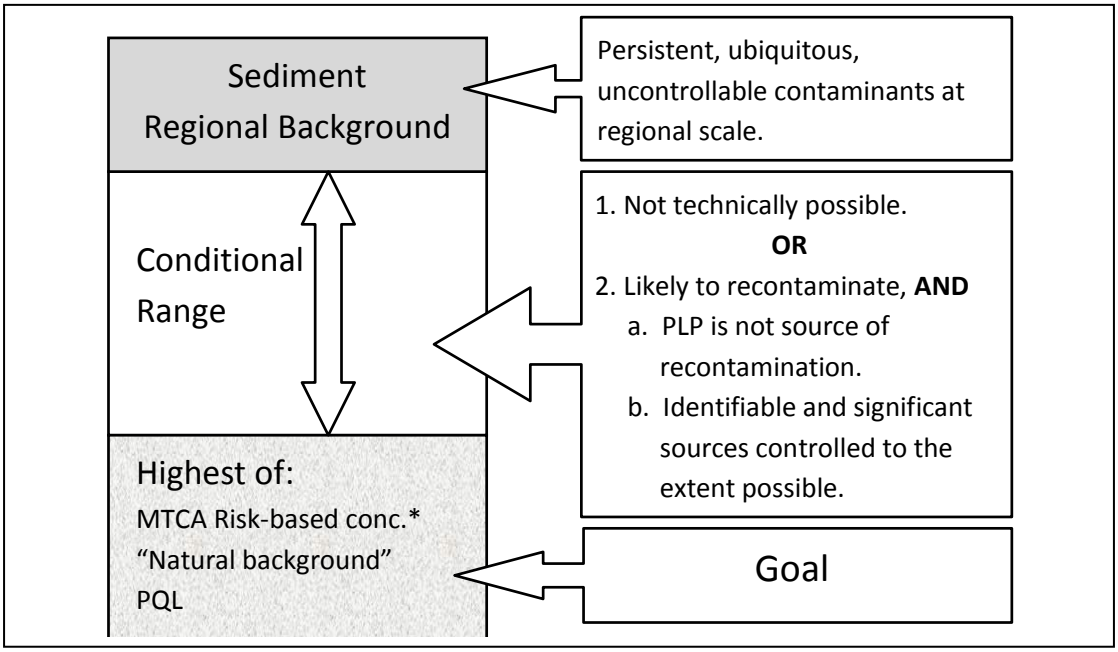
How should the human health narrative and background concentrations be considered when setting Sediment Cleanup Standards?

Decision

When setting sediment cleanup standards for human health exposure pathways at contaminated sediment sites:

- Use a decision making framework, background definition, and level of human health protection that align with the MTCA rule approach for setting cleanup standards. (Option 1)
  OR
- Use a decision making framework that is similar to the current SMS approach for benthic toxicity so that cleanup standards may be set within a range of acceptable concentrations. This option uses MTCA levels of human health protection and natural background as the goal, but allows higher cleanup standards to be set under certain conditions. (Option 2)

What is the option?



Clarify the Sediment Management Standards rule so that sediment cleanup standards are set based on an approach that is similar to the SMS for the benthic toxicity exposure pathways (sediment cleanup standards are set within a range), and has a sediment quality objective that is consistent with MTCA human health protection levels. Some of the features of this approach include:

Sediment cleanup standards for human health exposure pathways can be set within a range, based on certain conditions and considerations.

Lower end of the Range is the goal and based on MTCA human health level of protection.

The lower end of that range of sediment concentrations is the goal and will be achieved whenever it is feasible to do so. The lower end of the range of concentrations (the goal, or sediment quality objective) shall be based on the MTCA human health level of protection. The MTCA human health level of protection is a sediment cleanup standard based on the highest sediment concentration associated with:

1. The lowest risk-based concentration based on reasonable maximum exposure with a level of protection of:
    - A one in one million (1×10^{-6}) excess cancer risk for a single carcinogenic chemical and single exposure pathway.
    - A one in one hundred thousand (1×10^{-5}) excess cancer risk for multiple carcinogenic chemicals and/or multiple exposure pathways.
    - A hazard quotient of one for a single non-carcinogenic chemical and a single exposure pathway.
    - A hazard index of one for multiple non-carcinogenic chemicals and/or multiple pathways with similar modes of toxicity.
2. "Natural background" which is defined in MTCA to include ubiquitous anthropogenic sources but not localized anthropogenic sources.

3. Practical quantitation limit – the minimum concentration that a chemicals can be quantified with a specified degree of accuracy and precision.

Sediment cleanup standards may be set higher than the MTCA level of protection if it is not possible to meet the lower end of the range or it is likely to become recontaminated due to uncontrollable sources.

The conditions that will allow a sediment cleanup standard to be set higher than the sediment quality objective are:

1. It is not technically possible, regardless of cost, to achieve the sediment quality goal.

   OR
2. Recontamination is likely, AND
   a. The recontamination is not from the Potentially Liable Party (PLP) involved in the cleanup action.

   AND

b. Identifiable and significant sources of the contaminant are controlled to the extent possible.

The upper end of the range is based on Regional Background concentrations.

Regional background is defined as "Hydrodynamically defined area based on mechanisms of contribution and distribution of persistent, ubiquitous, and uncontrollable contaminants". Regional background has an intermediate scale between "natural" and "area" background as defined in MTCA rule. Regional background cleanup standards will be determined by statistical comparison of background and site datasets. Statistical methods are yet to be determined. Regional background cannot include significant contamination that was caused by the PLP involved in the cleanup action.

The regional background approach may not be appropriate in smaller waterbodies. This approach is recommended mainly for persistent bioaccumulative chemicals in urban basins of Puget Sound, although may be applicable in other areas.

What are the advantages of this option?

The sediment quality goal is aligned with the MTCA rule cleanup level for human health protection. For many sites, setting sediment cleanup standards to protect human health will be consistent with the MTCA approach.

It is anticipated that some sites will use a simplified process that is equivalent to the MTCA approach. For both simple sites and more complex sites, we will lay out a process for setting sediment cleanup standards and selecting remedial options that provide predictability for the PLP performing cleanup actions. A more complex process with additional considerations and additional data needs will only be used under certain conditions and when the sediment quality objective cannot be achieved or is not sustainable.

This approach allows flexibility for special cases so that sites can be cleaned up. This approach:

- Allows flexibility in setting sediment cleanup standards when it is not technically possible, regardless of cost, to achieve natural background concentrations.
- Allows flexibility in setting sediment cleanup standards in urban and industrial areas where ubiquitous contaminants are present in large areas of the sediment.

This approach may result in sediment cleanup standards that are more attainable and may allow more cleanup actions to be completed. PLPs may be more likely to move forward with cleanup actions that will resolve their liability for the contamination. Also, this approach will provide incentives to identify and control sources of contaminants to the sediment.

Having a range of standards for human health protection will make it easier to apply to other sections of the rule, such as listing of cleanup sites and source control. The current SMS structure

has provisions to allow Sediment Impact Zones near outfalls to fall within the range of acceptable criteria. In the SMS, the upper end of the range (CSL) has been the level that triggers a site becoming a cleanup site. Although this rule revision is not being considered for the other parts of the rule at this time, it may be considered at some point in the future.

What are the disadvantages of this option?

Sediment cleanup standards based on regional background may be set higher at some sites. The MTCA level of sediment cleanup standards may not be achievable or sustainable at a particular site, so lower cleanup standards are only "on paper". Residual contamination may create human health risks that are greater than MTCA definition of "natural background" levels. However, a lower cleanup standard may not make any difference because of technical infeasibility or recontamination.

The process of setting sediment cleanup standards and selecting remedial options can be more complicated for some sites. Additional investigations and data collection may be needed to justify setting sediment cleanup standards higher than the MTCA level of protection. The complexity of the approach may make it difficult for staff, PLPs, and the public to understand the regulations. It may be costly to investigate, identify and control sources of contamination that may cause recontamination at the site. It may be costly to collect data to establish regional background concentrations. It may be difficult to define "regional background" so that it is unambiguous and applicable to many different types of water bodies.

This approach is not completely consistent with the MTCA rule approach for other media. MTCA rule does not use a "regional background"when setting cleanup standards. This approach is not completely consistent with how sediment cleanup standards are set for benthic toxicity pathways in the SMS, where both cost and feasibility are considered when setting a sediment cleanup standard.

This approach may resolve liability for a PLP after they have done a cleanup action that includes everything technically possible to reduce concentrations. In the future new technologies may become available that make cleanup to lower levels possible, but PLP will have already completed the cleanup action.

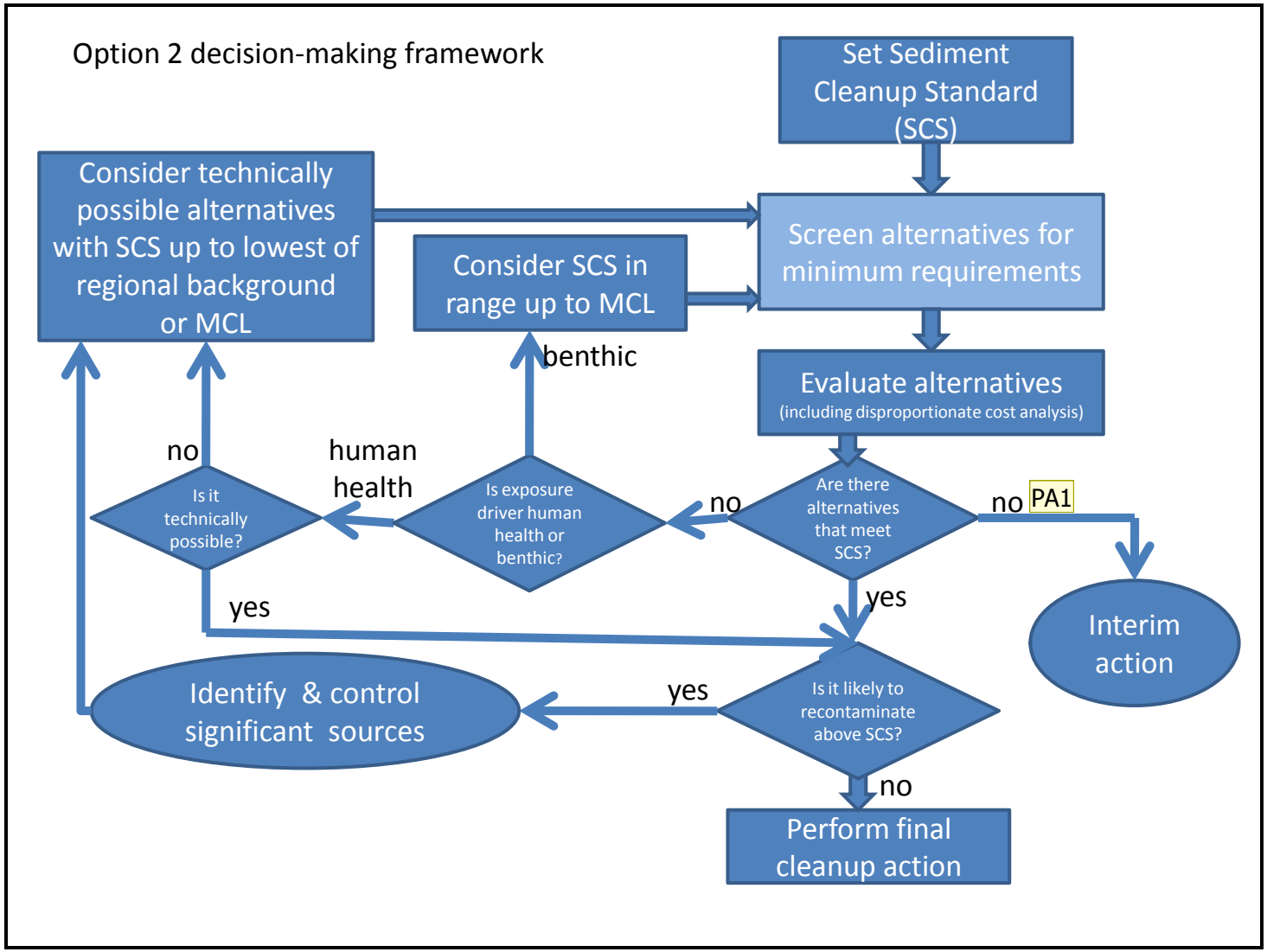
What is the scope of the preferred option?

- Specify in the SMS rule that the goal for sediment cleanup actions is to attain an acceptable level of exposure that will protect human health from sediment contamination based on the MTCA rule levels.
- Use MTCA rule definition of natural background in setting the goal for sediment cleanup standards.
- The SMS framework would remain unchanged for the benthic toxicity exposure pathway, allowing the cleanup standard to be set within a range between Sediment Quality Standards

(SQS) and Cleanup Screening Level (CSL) depending on net environmental effects, cost, and feasibility.

- If the human health exposure-based concentration is lower than the benthic toxicity criteria, the human health criteria would be the goal for the sediment cleanup standard and vice versa.
- If the "natural background" concentration of the chemical is higher than the risk-based cleanup standards, natural background (using MTCA definitions) would become the goal for the cleanup standard.
- If the Practical Quantitation Limit for the chemical is higher than risk-based cleanup standards and natural background, the Practical Quantitation Limit would become goal for the sediment cleanup standard.
- If the goal sediment cleanup standard is not technically possible to achieve at the site, higher sediment cleanup standards can be considered when developing remedial options. The sediment cleanup standard will be based on a statistical comparison of regional background and site data. Statistical methods are yet to be determined.
- Regional background is defined as levels of contamination (concentrations) that are persistent, ubiquitous in large areas and cannot be controlled or attributed to potentially liable parties. It will not include areas that have contamination that are attributable to the PLP or other point sources.
- If the site is likely to be recontaminated by these ubiquitous and uncontrollable sources, the sediment cleanup standard may be set higher than the goal on the following conditions:
    - Identifiable and significant sources of the contaminant are controlled to the extent possible.
    - The sediment cleanup standard will be based on a statistical comparison of regional background to site data. Statistical methods are yet to be determined.

  Using a higher sediment cleanup standard than the goal or sediment quality objective will be a more complex process, and require additional data collection and analysis. The "regional background" approach may not be applicable to all water bodies and all chemicals.


Option 2 decision-making framework
Set Sediment Cleanup Standard (SCS)
Consider technically possible alternatives with SCS up to lowest of regional background or MCL
Consider SCS in range up to MCL
Screen alternatives for minimum requirements
benthic
Evaluate alternatives
(including disproportionate cost analysis)
no
human health
Is it technically possible?
Is exposure driver human health or benthic?
no
Are there alternatives that meet SCS?
no PA1
Interim action
yes
yes
Identify & control significant sources
yes
Is it likely to recontaminate above SCS?
no
Perform final cleanup action

How could this option apply to the WAC?

The following sections provide a general concept of sections of the Sediment Management Standards that might be revised. This is not being rproposed as specific rule language.

For option 2, there are three sections that would address setting sediment cleanup standards.

The first section (-570(2)) sets the lower level or goal of the cleanup, equivalent to the Sediment Quality Standards (SQS) for benthic toxicity.

The second section (-570(3)) sets the upper level, or maximum cleanup level allowed at the site, equivalent to the Minimum Cleanup Level (MCL)/ Cleanup Screening Level (CSL) for benthic toxicity.

The level of human health protection and and used of background are the same in both of these sections (570-(2) and 570-(3)), but the benthic toxicity criteria are different.

The third section describes the alternative method of setting human-health based cleanup levels with a maximum based on regional background, and conditions that it only be used if it is not attainable or sustainable to meet the human health standards in sections (2) and (3).

WAC 173-204-570 (2) establishes the cleanup objective for sediment cleanup sites. *This section may be revised to specify the level of human health protection and background definition for the* ***c****leanup objective, and to state that the cleanup objective shall be the highest of:*

(1) The lowest exposure-based safe sediment concentration for:

(a) Benthic community protection: Sediment Quality Standards criteria as described in WAC 173-204-320 through 173-204-340.

(b) Human Health protection: The lowest risk-based concentration based on reasonable maximum exposure with a level of protection of:

(i) A one in one million (1×10^{-6}) excess cancer risk for a single carcinogenic chemical and single exposure pathway.

(ii) A one in one hundred thousand (1×10^{-5}) excess cancer risk for multiple carcinogenic chemicals and/or multiple exposure pathways.

(iii) A hazard quotient of one for a single non-carcinogenic chemical and single exposure pathway.

(iv) A hazard index of one for multiple non-carcinogenic chemicals and/or multiple exposure pathways with similar modes of toxicity.

(c) Biological resource protection from bioaccumulative pollutants. (to be defined)

(2) "Natural background" which is defined in MTCA to include ubiquitous anthropogenic sources but not localized anthropogenic sources.
(3) Practical quantitation limit – the minimum concentration that a chemicals can be quantified with a specified degree of accuracy and precision.

***WAC 173-204-570 (3) establishes the minimum cleanup level (maximum concentration) allowed at the site and** the level of biological effects permissible at the cleanup site by year ten after completion of the active cleanup action. This section may be revised to specify the level of human health protection for the maximum concentration allowed at the site, and to state that the sediment cleanup standard shall not exceed the highest of:*

(1) The lowest exposure-based safe sediment concentration for:
- *(a) Benthic community protection: Minimum Cleanup Level criteria as described in WAC 173-204-520 through 173-204-540.*
- *(b) Human Health protection: The lowest risk-based concentration based on reasonable maximum exposure with a level of protection of:*
  - *(i) A one in one million (1×10^{-6}) excess cancer risk for a single carcinogenic chemicals and single exposure pathways.*
  - *(ii) A one in one hundred thousand (1×10^{-5}) excess cancer risk for multiple carcinogenic chemicals and multiple pathways.*
  - *(iii) A hazard quotient of one for single non-carcinogenic chemicals.*
  - *(iv) A hazard index of one for multiple non-carcinogenic chemicals with similar modes of toxicity.*
- *(c) Biological resource protection from bioaccumulative pollutants. (to be defined)*

(2) "Natural background" which is defined in MTCA to include ubiquitous anthropogenic sources but not localized anthropogenic sources.
(3) Practical quantitation limit – the minimum concentration that a chemicals can be quantified with a specified degree of accuracy and precision.

An additional section would be added on "Alternative minimum cleanup level (maximum concentration)"

An alternative sediment minimum cleanup level may be used under some circumstances and with some conditions.

The alternative minimum cleanup level must be less than regional background in a statistical comparison of regional background to the site data. (Statistical methods are yet to be determined.) .

Regional background is defined as "Hydrodynamically defined area based on mechanisms of contribution and distribution of persistent, ubiquitous, and uncontrollable contaminants" *Regional background includes levels of contamination that are persistent, ubiquitous in large areas and cannot be*

controlled or attributed to potentially liable parties. It will not include areas that have contamination from the PLP or from other point sources.

The "regional background" approach may not be applicable to all water bodies and all chemicals. In many cases, regional background concentrations will not be any higher than natural background concentrations.

The alternative sediment minimum cleanup standard may only be used if:

1. *It is not technically possible, regardless of cost, to achieve the minimum cleanup level described in WAC 173-204-570 (3).*

OR

2. *If the site is likely to be recontaminated by ubiquitous and uncontrollable sources, and all of the following :*

    - ***The PLP is not the source of the recontamination.***

    AND

    - *Identifiable and significant sources of the contaminant are controlled to the extent possible.*